

# DEVELOPMENT OF AUXILIARY EQUIPMENT FOR 1 SEATER DRAG BUGGY

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for the award of the  
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### **SUPERVISOR'S DECLARATION**

We hereby declare that we have checked this project and in our opinion this project is satisfactory in terms of scope and quality for the award of the degree of Diploma of Mechanical Engineering

Signature:

Name of Supervisor:

Position:

Date:

### **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature

Name:

ID Number:

Date:

## ACKNOWLEDGEMENTS

I am so glad and grateful to god for gave me strength and determination for done this project. I also would like to express my sincere to my supervisor Mr Mohd Fazli bin Ismail. He always gives me guidance during processing this project. He helps me in any aspects and without him this project won't be done properly. I am really grateful with his support and continuous encouragement without feel any burden for him. I am also to say thank you to my instructor Mr Farizul Shahidan bin Rajuli, who teach and instruct me how this project should be make. He always gave his faith with my ability that this project will be done successfully.

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## **ABSTRACT**

Development of Auxiliary Equipment for one seater drag buggy is one of the Mechanical Faculty project and this task of the project must be completed by Mechanical Engineering student. Project Objective is to design brake pedal, fuel pedal, piping and tank attachment and to fabricate the mechanical part of the system. This project must be complete to ensure the whole system of the drag buggy car can be applied. Several aspects must be consider when make analysis such as strength analysis, dimension analysis selection concept analysis. All the system must be done without collide or bother any system to avoid another system failure when applying. So, efficiency is important criteria to make this system go well. Then, fabrication and modification process should be making properly. If any problem occurs, it will become dangerous for the driver. Another thing that should have to develop this project is knowledge, skills and interest feeling. Without that, this project can't be going far. So, all the process must be follow on the flow and all system should be making correctly and properly for the perfection.

## ABSTRAK

Pembinaan kelengkapan tambahan untuk kereta buggy ini adalah salah satu projek Faculti Mekanikal dan misi ini haruslah disiapkan oleh pelajar Diploma Kejuruteraan Mekanikal. Objektif projek ini adalah untuk membangun dan membina tempat sambungan untuk pedal minyak, pedal brek dan tangki. Projek ini harus disiapkan untuk memastikan keseluruhan sistem kereta buggy ini dapat digunakan. Beberapa aspek harus diambil kira ketika analisis dijalankan seperti kekuatan, pemilihan konsep dan anggaran ukuran. Sistem untuk kereta ini haruslah disiapkan tanpa menganaggu atau melanngar sebarang sistem lain di dalam kereta ini dan mengelakkan sistem lain gagal untuk berfungsi. Jadi, kecekapan adalah salah satu kriteria penting untuk sistem ini siap dengan jayanya. Disamping itu, proses modifikasi haruslah dilakukan dengan betul. Jika tidak dilakukan dengan betul, ia akan mengundang bahaya kepada pemanduan. Antara penting yang harus ada ketika membangun projek ini adalah pengetahuan, skil serta minat. Tanpa kriteria itu, projek ini tidak akan kemana. Jadi segala proses untuk menyiapkan projek ini haruslah dilakukan mengikut aturan dan keseluruhan sistem haruslah dilakukan dengan betul untuk mencapai kesempurnaan.

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## CHAPTER 1

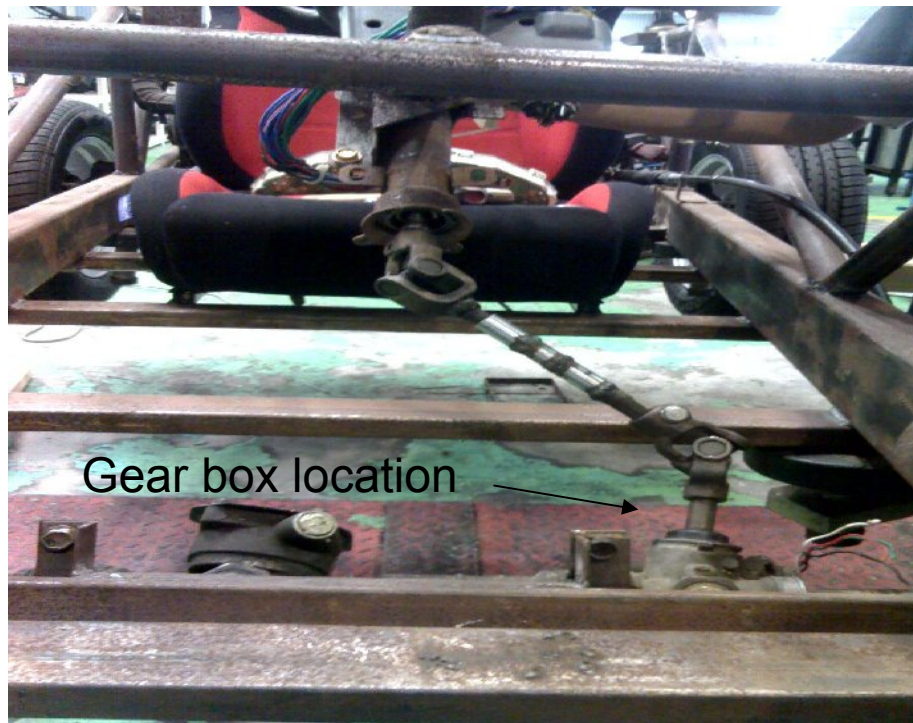
### INTRODUCTION

#### 1.1 Project Background

University Malaysia Pahang with Faculty Mechanical Engineering develop a speed buggy car contribute to FELDA. Actually, this off road buggy car use as observation car or another function that related with the car can produce in estate widely. So, one system required to this buggy car. The systems are tank attachment, brake pedal and fuel pedal. This project is to design brake pedal, fuel pedal and fuel tank attachments and fabricate the mechanical part of the system. All skills and knowledge that learned before is very useful to this project succeed.

#### 1.2 Problem Statement

Scope of the task is to **complete the auxiliary equipment** for this speed buggy car. Auxiliary equipment is covered brake pedal, fuel pedal and fuel tank attachment. This system does not exist yet, so the system must complete the system for this car. the problem is to analysis how the attachment place can support and sustain the load or force when attachment install. All the force and load must be calculated to avoid this system failure. The other problem is the location and limitation area of the attachment. So, the result of this system should not bother another system of this car. The result also concerns the safety and then, it won't be any problem when applying all the system.



**Figure 1.1: Pedals attachment and fuel tank attachment location**

### **1.3 Project Objective**

The objective of this project is to:

- a) To design and modify brake pedal, fuel pedal, piping and fuel tank **attachments** for 1 Seater Drag Buggy.
- b) To fabricate the mechanical part of the system.

#### **1.4 Project Scopes.**

The scope of this project is:

- a) Literature review on the knowledge of design brake pedal fuel pedal, piping and fuel tank.
- b) Design detail project by using sketching and Solid Work.
- c) Simple analysis by using static calculation for pedal attachment and for tank using COSMOS.
- d) Fabricate the attachments with the analysis of the system.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Single seater drag buggy is a light weight speed vehicle. The chassis are custom fabricated to reduce the weight and increase the stability of the vehicle. The drag buggy car commonly operates with rear wheel transmission and rear engine placement to give more acceleration power and it will increase speed of the car.

#### **2.2 Fuel pedal and brake pedal system**

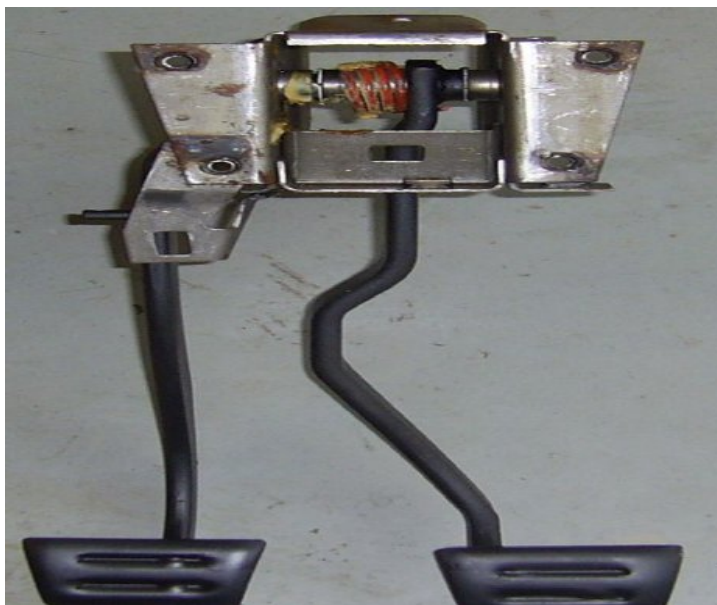
The buggy fuel and brake pedal system is not too far with car and go kart system. Differences between buggy and normal car and kart just the design and how many they use. They normally may have two or four foot pedals. They also normally clutch pedal operated by left foot not in case of automatic transmission and right foot normally operated brake and fuel pedal. Most of car in this world use disc and drum system. That's same with this buggy car system.



**Figure 2.1:** three pedals car system



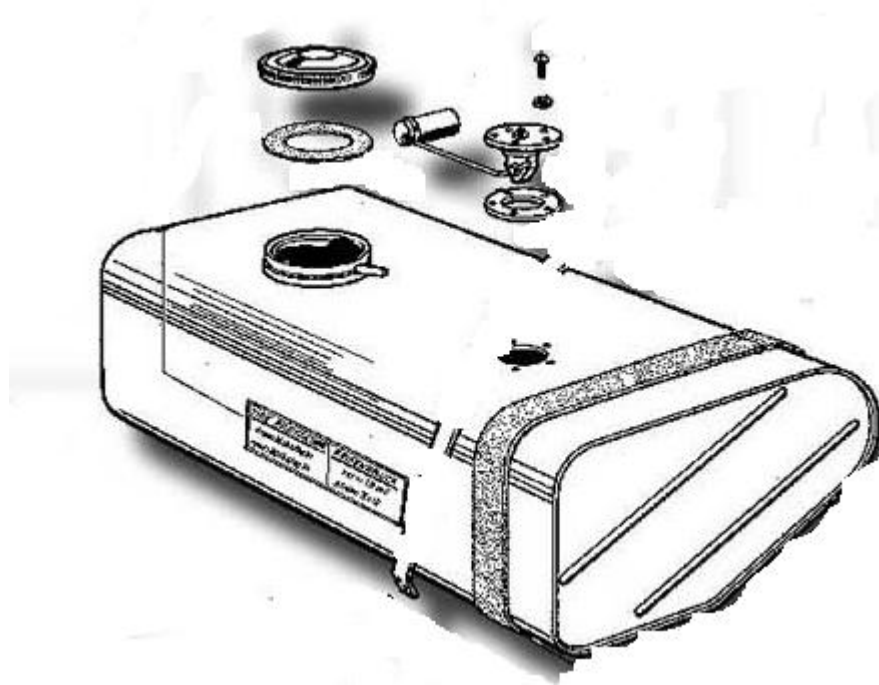
**Figure 2.2:** Four pedals car system (manual transmission)



**Figure 2.3:** Two pedals car system (automatic transmission)

### **2.3 The Fuel Tank System.**

Fuel tank is important part in buggy car system. Function fuel tank is to supply fuel to the engine for ignition process with air. The difference between the normal car and buggy car is the position of the tank. For normal car, the tank position at the rear car. For buggy car, the tank position at front car, it's because engine for the buggy car at rear place different with the normal that the engine located at the front place.



**Figure 2.4:** Commonly tank view

## **CHAPTER 3**

### **PROJECT METHODOLOGY**

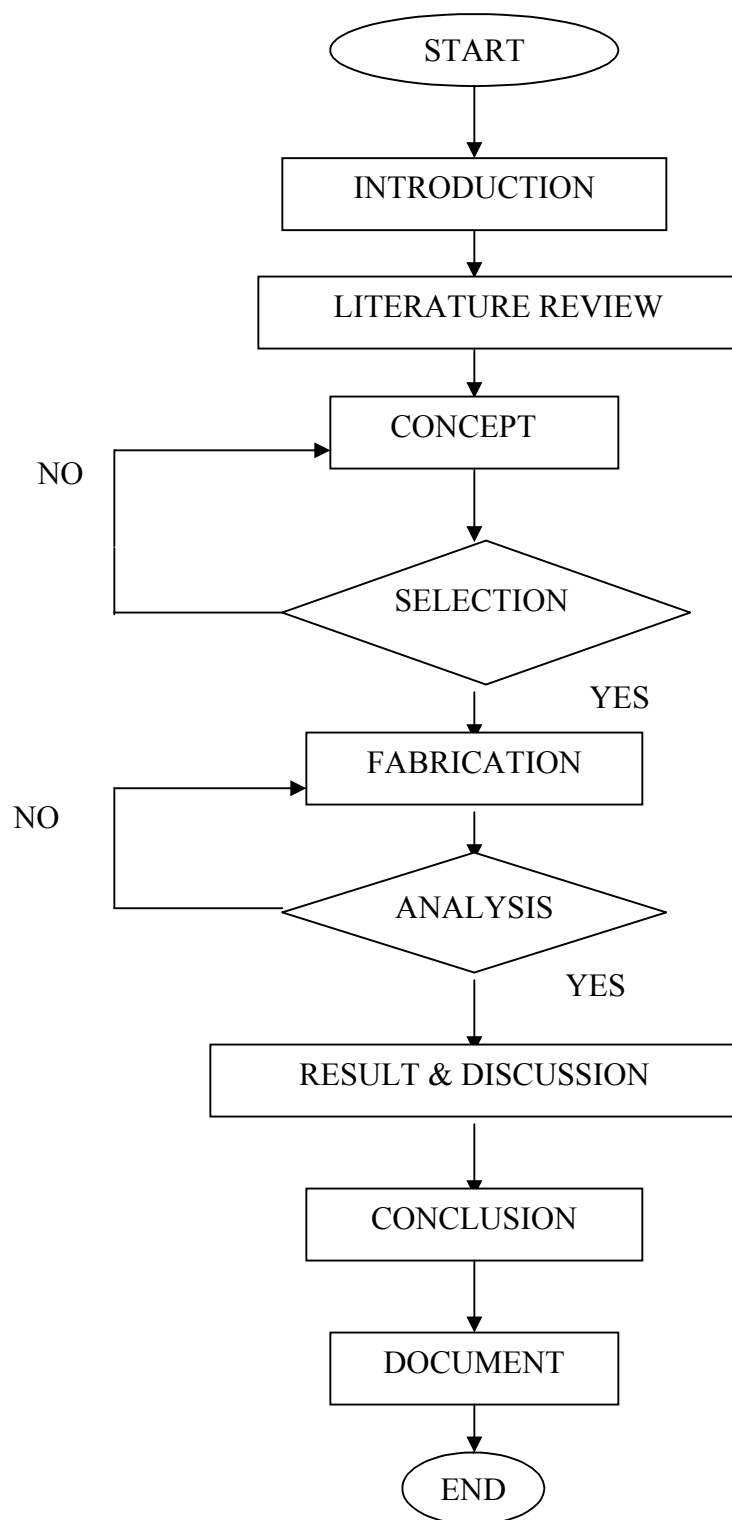
#### **3.1 Project flow Chart**

To make sure this project complete on schedule, flow chart is too important to assure all the planning running smoothly. This project will be start with literature review. This stage is enquiring about investigation and analysis of the literature review and fine the information that help this project.

Then, the next stage is developing design ideas sketching for all parts. Several ideas will be create and that ideas must be possible with this project. At least three ideas are need to choose the best ideas selection.

Then, go through to selection the best ideas. After that, detail design of the parts by using Cad drawing with true dimension. If the problem occurs when develop detail design such as dimension error, turn back to the selection ideas and make a correction.

After confirm the detail design, the fabrication process can be start. Period of this stage is longer with other stage. Concentration for this stage is important to avoid any problems. After finish the fabrication process, analysis will be make to make sure the system can be running. If any problem occurs when analysis the system, make sure go back to fabrication process to do the correction for that error. Lastly, prepare a proper report for this project before submit and also prepare the final presentation

**Figure 3.1:** Flow Chart

### **3.2 Drawing**

The drawings divided by two:

- a) Sketching: sketching the concept ideas before chooses the best ideas as a concept of the project.
- b) Solid works drawing: the best concept sketching will be transfer to Solid Works application with true dimension.

### **3.3 Sketching**

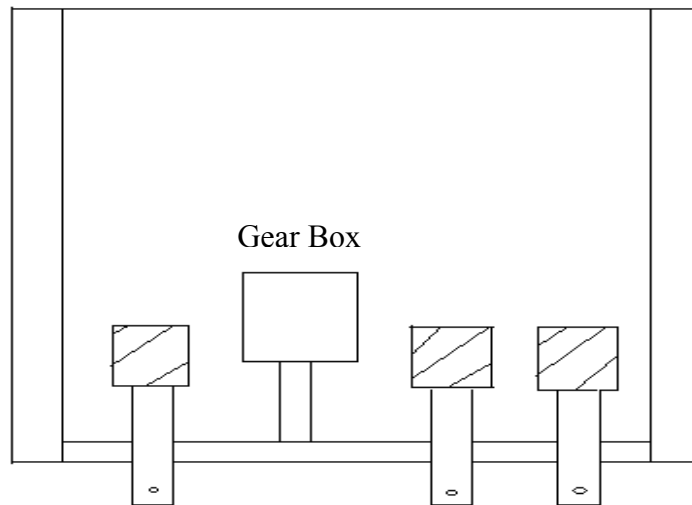
This project sketching ideas consist three ideas, three for fuel pedal, brake pedal, clutch pedal attachment and three for fuel tank attachment. Only one design consider as the final ideas. The sketching ideas are:

#### **3.3.1 Fuel, brake, clutch pedal attachment.**

When develop concept of ideas for pedal attachment, several criteria must be concern. One of the criteria is possibility the system can be apply. Another criteria is spacing of the foot when step on the entire pedal.

### 3.3.1.1 Concept A

In this case, the entire pedal won't clash with another system (gear box) and problem only apply which step on the pedal, foot surface will clash and bother with attachment of linkage (cable).



**Figure 3.2:** Concept A

### 3.3.1.2 Concept B

For this concept, both side feet can step on the pedal because the distance between two pedals is wide but the problem here is the middle pedal will clash with another part of this car (gear box).